

8.1.2 Linac Systems Turn on for BLIP

1. **Purpose**

To provide instructions for Linac specialists on how to turn on the Linac systems in preparation for operation for BLIP.

2. **Responsibilities**

- 2.1 Linac specialists are responsible for executing this procedure.
- 2.2 The Linac Operations Coordinator is responsible for insuring that this procedure is implemented accurately and completely.

3. **Prerequisites**

- 3.1 Control System must be operational.
- 3.2 Qualified and trained Linac specialists.
- 3.3 The Linac Operations Coordinator should be consulted concerning Linac turn on.
- 3.4 The on duty MCR OC shall be informed of the intent to turn BLIP on and of planned running schedule.

4. **Precautions**

- 4.1 Linac Supervisor, or Operations Coordinator, must have cleared the Linac tunnel for rf, and the Tank 1 and Tank 9 gates must be closed prior to feeding rf into the accelerating cavities.
- 4.2 The Linac tunnel, HEBT, and BLIP must be secured prior to accelerating beam in the Linac.

5. **Procedure**

Note:

If the Linac has already been turned on for the Booster ([C-A-OPM 8.1.1](#)), then jump immediately to step 5.14.

- 5.1 Check the Building Services panel in the Linac Control Room (LCR, rack F-11) to see that all water services are available. Contact the Water Group if any water system needs to be turned on.
- 5.2 Check the status of the vacuum for the ion source, LEBT (gauges in the preinjector area), tanks, and HEBT (gauges along the lower equipment bay). If any of the pressures are above 2×10^{-6} T, notify the C-A Vacuum Group.
- 5.3 Verify that the following beam stops are closed: Booster (LTB1 or LTBDH1 and LTB2), AGS (NZ304, NZ307), Tank 9 (NZ86), and Source Valve 0-9. The indicator lights for the status of these devices are located in ICR Rack F2.
- 5.4 Initiate the Ion Source Turn On [C-A-OPM 8.1.5](#).
- 5.5 Initiate the Cavity RF Systems Turn On [C-A-OPM 8.1.6](#).
- 7.4 Initiate the RFQ turn on [C-A-OPM 8.1.7](#).
- 5.7 Initiate the LEBT Transport and Bunchers Turn On [C-A-OPM 8.1.8](#) and [8.1.9](#).
- 5.8 Initiate the Tank Quadrupole Turn On [C-A-OPM 8.1.10](#).
- 5.9 Initiate the HEBT Turn On [C-A-OPM 8.2](#).
- 5.10 Turn on the BLIP Quadrupoles and Steerers by doing the following:
 - 5.10.1 Check that the main 460 VAC disconnect switches are on
 - Switch 8A, on the HEBT SE wall, opposite the plug door.
 - Switch 8B, same location
 - Switches for PQ38, PQ49, and PQ52, on the HEBT SE wall, just upstream of the exit door
 - 5.10.2 Check that the main breaker for the Mod 9 rack is on (at the upstream end of the rack, labeled "For Quad PS Only").
 - 5.10.3 Check that the main breaker for the HEBT rack is on (inside the front door on rack closest to the BM2 PS).
 - 5.10.4 If the tunnel is not yet secured, notify any people inside that the BLIP quadrupoles and steerers will be coming on.
 - 5.10.5 The BLIP quad turn on button is in rack M9A3. If the switch does not indicate a malfunction, clear the "Local Lock" and turn on the supplies. If a "Remote Lock" is indicated, then this must be cleared by the "BLIP QUADS" switch in the Linac control room, rack F7. If a malfunction is

indicated, check that the BLIP water is on and that the BLIP temperature panel is reset. Both can be checked on the panel on the HEBT SE wall, just upstream of the exit door.

- 5.10.6 Check to make sure that the spreadsheet settings for all BLIP quadrupoles and steerers are at the last saved values, as per BLIP file.
- 5.10.7 In about 2-5 minutes, after turn on of the supplies, all malfunction lights should be out. If a light remains on, check the corresponding supply. If a supply is bad, turn off all supplies and follow the spare replacement procedure.
- 5.11 Turn on the BM1 and BM2 power supplies by doing the following:
 - 5.11.1 Check that the main 460 VAC disconnect switches are on
 - Switch BM-1, HEBT SE wall opposite the plug door
 - Switch 10 - BM2, same location
 - 5.11.2 Check that the main breaker for the HEBT rack is on (same as step 5.10.1.).
 - 5.11.3 Check the BLIP Hardwired Interlock panel, located in rack A14, has all the red lights on. If not, then all BLIP facility interlocks aren't cleared and BM1/2 won't come on. Contact a member of the BLIP staff to investigate.
 - 5.11.4 If the tunnel is not yet secured, notify any people inside that BM1 and BM2 will be coming on
 - 5.11.5 If there is no malfunction indicated on the BM1, turn on button (rack A12), clear the "Local Lock" and turn on the supply. If a "Remote Lock" is indicated, then this must be cleared by the "Bending Mag 1" button in the Linac control room, rack F6. BM2 is turned on in the local mode at the P.S. located in HEBT. If in the remote mode the P.S. is turned on from the ICR PLC Panelview Screen in Rack F6. If a malfunction is indicated, check that the BLIP water is on (done in step 5.10.5 above).
 - 5.11.6 Check that the spreadsheet setting for BM1 and 2 are at the last saved values, as per BLIP file.
 - 5.11.7 Within 2-5 minutes, the "BM2 current malfunction" light in rack M16A2A2, and the "BLIP malfunction" light in rack location M9A3 should go out. If a light remains on, check the corresponding supply. If a supply is bad, turn off both supplies and contact a system expert to checkout the supply.
- 5.12 If the Linac, HEBT, and BLIP tunnels are not yet secured, contact the on duty MCR OC to have the tunnels secured.

- 5.13 The turn on is complete when the following are fulfilled:
- 5.13.1 The ion source is operating at 35 kV, and beam can be measured at the L1 transformer.
 - 5.13.2 The tank rf, RFQ, LEBT, HEBT, and tank quad systems are all on with no system malfunctions indicated in the ICR.
 - 5.13.3 Satisfactory vacuum has been attained in all sections. (If a section other than the ion source has a pressure greater than 2×10^{-6} T, the C-A Vacuum Group should investigate and give approval before operation).
 - 5.13.4 Linac, HEBT, and BLIP tunnels are secured.
- 5.14 If the Linac has already been turned on for the Booster, only the following has to be done for BLIP Turn on:
- 5.14.1 Check the status of the BLIP vacuum (gauges in the lower equipment bay). If any pressure is above 2×10^{-6} T, notify the C-A Vacuum Group.
 - 5.14.2 Follow steps 5.10 and 5.11 above to turn on the BLIP quadrupoles and dipoles.

6. **Documentation**

- 6.1 Completion of Linac turn on will be entered in the MCR OC log and Linac Operations logbook.

7. **References**

- 7.1 [C-A-OPM 8.1.5, "Ion Source Turn On".](#)
- 7.2 [C-A-OPM 8.1.6 "Cavity RF Systems Turn On".](#)
- 7.3 [C-A-OPM 8.1.7 "Turn On of RFQ1".](#)
- 7.4 [C-A-OPM 8.1.8 "LEBT Bunchers Turn On".](#)
- 7.5 [C-A-OPM 8.1.9 "LEBT Transport Devices Turn On".](#)
- 7.6 [C-A-OPM 8.1.10 "Tank Quadrupole Turn On".](#)
- 7.7 [C-A-OPM 8.2 "HEBT Turn On".](#)

8. **Attachments**

None